NORTHROP GRUMMAN

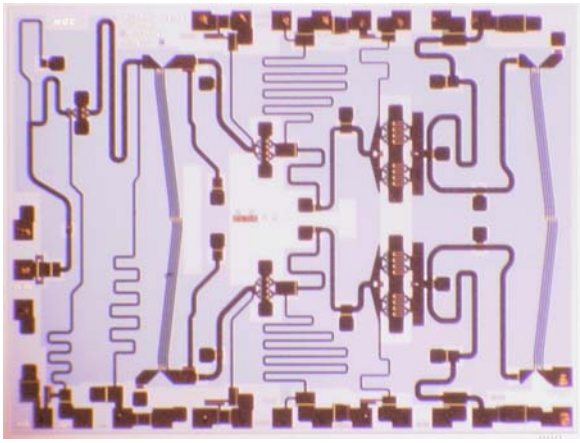
Velocium Products

APH637

13.5 – 15.5 GHz High Power Amplifier

Preliminary Datasheet

Revision: June 2007



X=2900 µm Y=2200 µm

Features

- RF Frequency: 13.5 -15.5 GHz
- Linear Gain: 30 dB typ.
- Psat: 31.5 dBm typ.
- P1dB: 30 dBm typ.
- IP3: 39 dBm typ.
- Die Size: < 6.4 sq. mm.
- DC Power: 5 VDC @ 690 mA Total

Applications

- Point-to-Point Digital Radios
- Point-to-Multipoint Digital Radios
- VSAT

Product Description

The APH637 monolithic HEMT amplifier is a broadband, three-stage power device designed for use in Commercial Digital Radios and VSAT Applications in Ku-Band. To ensure rugged and reliable operation, HEMT devices are fully passivated. Both bond pad and backside metallization are Ti/Au, which is compatible with conventional die attach, thermocompression, and thermosonic wire bonding assembly techniques.

Performance Characteristics (Ta = 25°C)

Specification	Min	Typ	Max	Unit
Frequency	13.5		15.5	GHz
Linear Gain	29	30		dB
Psat	30	31.5		dBm
P1dB	29	30		dBm
IP3		39		dBm
Input Return Loss	10	14		dB
Output Return Loss	10	15		dB
Vd1, Vd2a=Vd2b, Vd3a=Vd3b	3.5	5		V
Vg1, Vg2a=Vg2b, Vg3a=Vg3b		-0.5		V
Id1		40		mA
Id2a+Id2b		130		mA
Id3a+Id3b		520		mA

Absolute Maximum Ratings (Ta = 25°C)

Parameter	Min	Max	Unit
Vd1, Vd2a=Vd2b, Vd3a=Vd3b	3.5	5.5	V
Vg1, Vg2a=Vg2b, Vg3a=Vg3b	-1	+0.3	V
Id1		55	mA
Id2a+Id2b		190	mA
Id3a+Id3b		700	mA
Input drive level		12	dBm
Assy. Temperature (60 seconds)		300	deg. C

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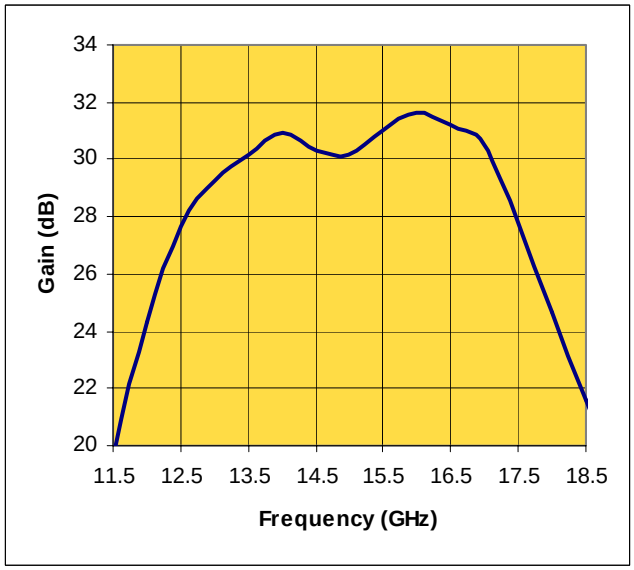
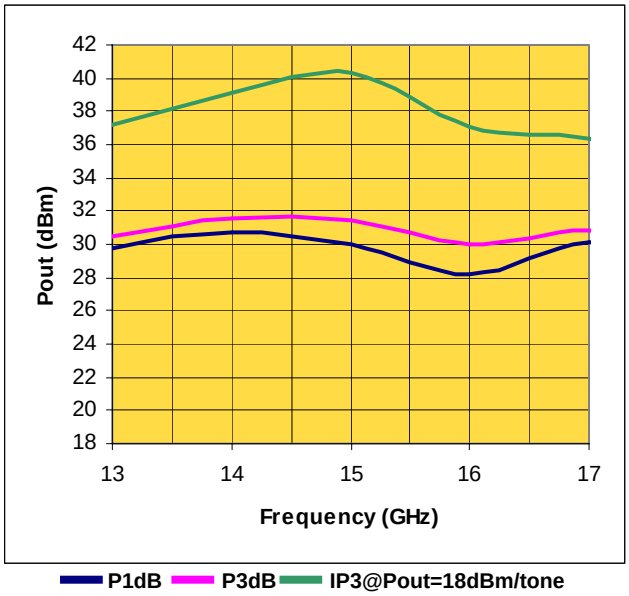
Measured performance characteristics (Typical at 25°C)
Vd1 = Vd2 = Vd3 = 5V, Id1 + Id2a +Id2b + Id3a + Id3b = 690 mA

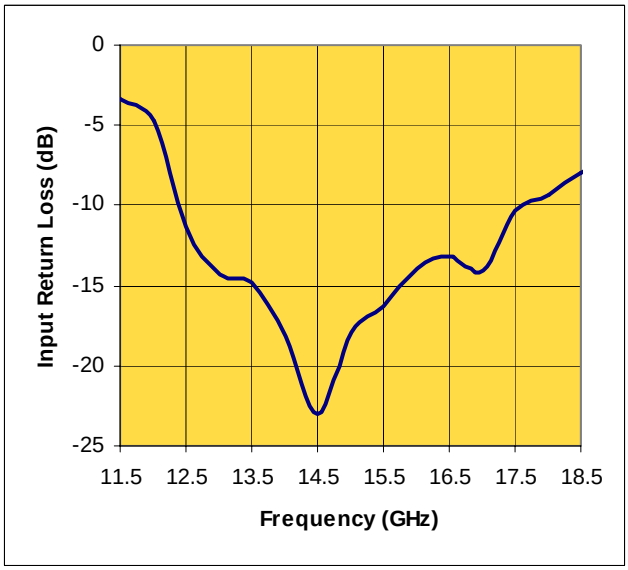
Linear Gain Versus Frequency



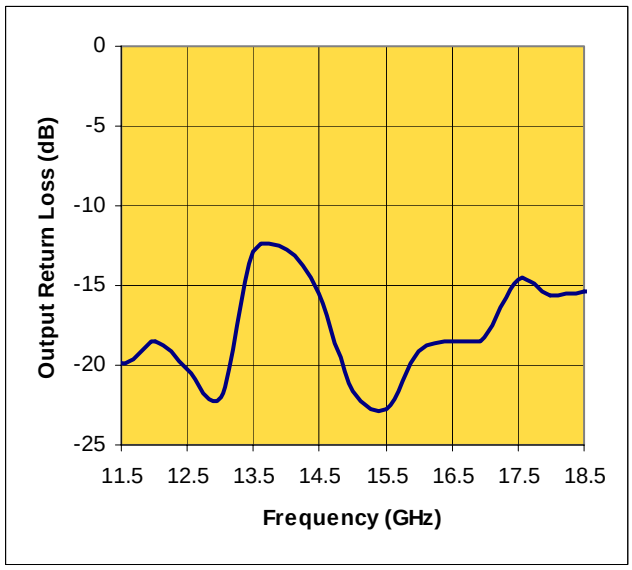
Fixtured Pout Versus Frequency



Input Return Loss Versus Frequency



Output Return Loss Versus Frequency



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Measured performance characteristics (Typical at 25°C)
Vd1 = Vd2 = Vd3 = 5V, Id1 + Id2a +Id2b + Id3a + Id3b = 690 mA

Freq GHz	S11 Mag	S11 Ang	S21 Mag	S21 Ang	S12 Mag	S12 Ang	S22 Mag	S22 Ang
11.00	0.75	-115.29	4.98	-26.02	0.00	116.25	0.15	88.66
11.50	0.68	-135.66	9.95	-71.43	0.01	118.82	0.10	79.27
12.00	0.58	-159.33	17.15	-120.60	0.01	55.05	0.12	66.70
12.50	0.27	156.77	24.46	-66.10	0.00	43.13	0.10	15.14
13.00	0.19	-41.60	28.91	133.32	0.00	37.11	0.08	-39.35
13.50	0.18	79.59	32.13	66.24	0.00	31.26	0.23	-137.36
14.00	0.13	93.76	35.12	9.83	0.00	-13.25	0.23	147.92
14.50	0.07	58.77	32.51	-38.33	0.00	-5.00	0.17	104.48
15.00	0.13	-50.83	32.15	-79.98	0.00	-29.97	0.08	93.48
15.50	0.16	-115.25	35.42	-136.78	0.00	-19.06	0.07	124.14
16.00	0.21	-59.81	38.13	138.71	0.00	-41.16	0.11	141.32
16.50	0.22	135.95	36.20	100.72	0.00	-87.39	0.12	117.68
17.00	0.20	126.13	33.10	41.76	0.00	85.80	0.12	133.93
17.50	0.30	104.99	24.82	-16.67	0.00	-7.80	0.19	115.59
18.00	0.34	90.75	17.42	-64.31	0.00	-50.03	0.16	102.22
18.50	0.40	80.42	12.12	-108.61	0.00	31.44	0.17	97.89
19.00	0.45	71.51	8.89	-149.06	0.00	69.75	0.17	91.93
19.50	0.51	64.35	6.56	125.15	0.00	71.16	0.17	86.32
20.00	0.59	57.55	4.72	111.29	0.00	24.03	0.16	82.14

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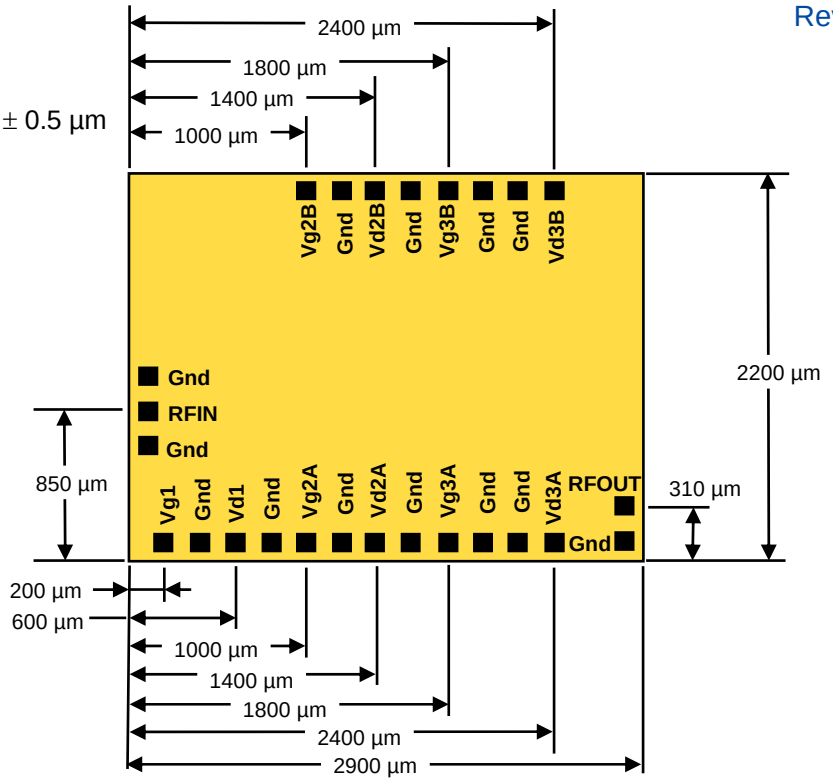
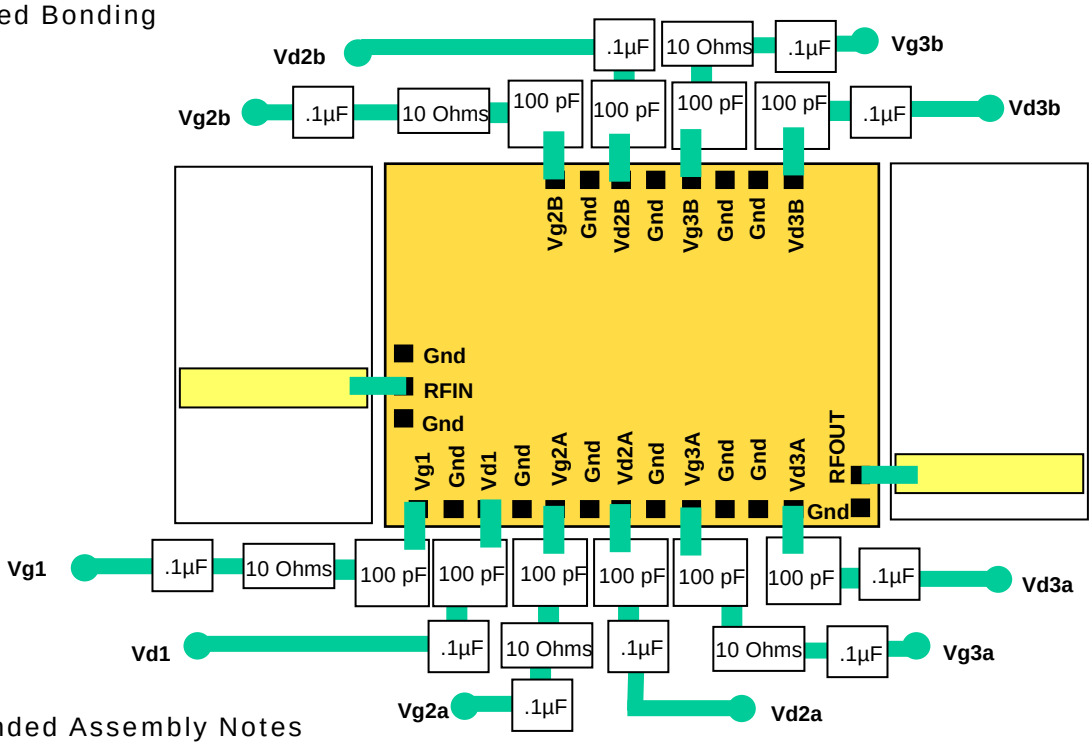
X Dimension: 2900 µm ± 25 µm
Y Dimension: 2200 µm ± 25 µm
Bond Pad Dimension: 101 x 101 µm ± 0.5 µm
Chip Thickness: 101 ± 5 µm



Suggested Bonding



Recommended Assembly Notes

1. Bypass caps should be 100 pF (approximately) ceramic (single-layer) placed no farther than 30 mils from the amplifier.
2. Best performance obtained from use of <10 mil (long) by 3 by 0.5 mil ribbons on input and output.